

PATENT SPECIFICATION

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(54) PIGMENTED PAINT

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 Schachthof 16, Germany, do hereby declare
 the invention for which we pray that a patent
 may be granted to us, and the method by
 which it is to be performed, to be particularly
 described in and by the following statement:—

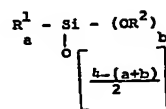
This invention relates to pigmented paints
 based on siloxane resins and polymers of
 methacrylic acid esters especially useful as
 a water-repellent facade-protecting paint.

The paint of this invention can be used
 for rendering building material of a mineral
 nature water-repellent.

It is known from German Auslegeschrift
 1,671,280 that mixtures of siloxane resins and
 polymethacrylic acid methyl esters can be
 employed as colourless impregnating agents
 for building materials and have a water-
 repellent effect. Such impregnating agents
 penetrate deeply into the building material
 and do not leave a visible film on the surface.
 Their water-repellent action is associated with
 increasing the interfacial tension of the water.
 The solids content of these impregnating
 agents in organic solvents is relatively low
 and is only approx. 3 to 8%, depending on
 the absorbency of the building material.
 Furthermore, a high proportion of aromatic
 solvents is required to achieve adequate com-
 patibility of the siloxane resin with the co-
 polymer.

In contrast to colourless impregnating
 agents, the optical effect of pigmented paints
 is important, the stability of the colour shade,
 and the gloss retention, being particularly im-
 portant. A certain minimum pigment volume
 concentration is normally required to achieve
 adequate opacity and weathering-resistant
 properties.

The present invention provides a pigmented
 paint containing a polymer of a methacrylic
 acid ester and a siloxane resin having units
 of the general formula



wherein R¹ is a methyl and/or phenyl radi-
 cal, R² is an alkyl radical with 1 to 4 carbon
 atoms, a has a value of 0.5 to 1.8 and b has
 a value of 0.2 to 2.5, preferably 0.3 to 1.2,
 the weight of siloxane resin being 10—50%
 by weight of the polymer.

The choice of the indices a and b in the
 ranges indicated ensures that the siloxane
 resin is of relatively low molecular weight.

The siloxane resins used in the invention
 are known and their production is described,
 for example, in German Patent Specification
 No. 2,020,224.

The hydrolysis and subsequent condensation
 of the OR² groups present in the siloxane
 resin contained in the paints of the invention
 takes place under the influence of atmos-
 pheric moisture, even at room temperature.
 The condensation of these compounds is
 accelerated by catalysts, for example tin cat-
 alysts, especially dialkyl - diacyl - tin com-
 pounds. Dibutyl-tin dilaurate is a particularly
 suitable catalyst. The organo-tin catalysts
 have the advantage that they are also com-
 patible with the methacrylic acid polymer.
 Further catalysts which can be used in the
 paints and additional comments on the cat-
 alysis are to be found in "Chemie und Tech-
 nologie der Silicone" by Walter Noll, Verlag
 Chemie GmbH (1968) at page 340.

The paint according to the invention there-
 fore preferably contains catalysts which accel-
 erate the hydrolysis and condensation, and in
 particular, the above-mentioned organo-tin
 catalysts.

Siloxane resins in which the group R¹
 represents a mixture of methyl and phenyl
 radicals are preferably used because they are
 readily compatible with the polymer compon-
 ent. Preferably, 20 to 80 mol% of the radicals
 R¹ are phenyl radicals.

The siloxane resins contained in the paint of the invention exhibit good compatibility with the polymer of the methacrylic acid ester. The particular polymer of the methacrylic acid ester used is not critical and examples of suitable polymers are those produced by polymerisation of esters of methacrylic acid or copolymerisation of esters of methacrylic acid and a copolymerisable monomer e.g. an ester of acrylic acid. The esters of methacrylic acid, and of acrylic acid, when they are used, will normally be methyl, ethyl, propyl, isobutyl or butyl esters. Esters where the alkyl group has at least 3 carbon atoms are preferred and at least the predominant proportion of the polymer (e.g. at least 70 molar percent) should preferably be the n-butyl ester or isobutyl ester of methacrylic acid, because of the good solubility in benzene of the resulting polymer.

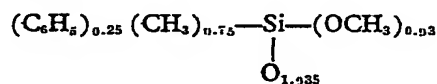
The good compatibility of the low molecular weight siloxane resins with the polymer results in the uniform distribution of the siloxane molecules in the paint film so that even at a low concentration of the siloxane resin, relative to polymer, a water-repellent effect is achieved. Preferably, the paints contain about 10% by weight of siloxane resin, relative to polymer.

The paints of the invention generally have a relatively high binder content and a low solvent content. The relatively high binder content is advantageous for weathering resistance and covering power. The high concentration, coupled with the use of an aliphatic solvent, is furthermore advantageous

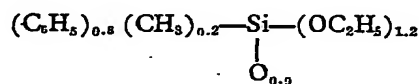
because this facilitates the practical use of the product by roller or brush application, even in cases of overpainting. It is particularly advantageous to use copolymers which are soluble in aliphatic solvents in the mixture of pigmented paints.

The table which follows shows typical recipes for paints according to the invention and comparative paint compositions containing smaller amounts of siloxane resin. The water repellency exhibited after two days is also shown. All numerical data in the table are percentages by weight. The siloxane resins used are designated by the figures I, II and III in the Table.

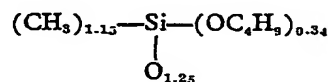
Siloxane resin I has units of the following structure:



Siloxane resin II has units of the following structure:



Siloxane resin III has units of the following structure:



TABLE

	Comparison		Examples					
	1	2	1	2	3	4	5	6
1. Siloxane resin I	0.50	1.00	2.00	3.00	4.00	5.00	—	—
2. Siloxane resin II	—	—	—	—	—	—	3.00	—
3. Siloxane resin III	—	—	—	—	—	—	—	3.00
4. Catalyst: organic tin compound	0.05	0.05	0.05	0.10	0.10	0.10	0.10	0.10
5. Polymethacrylic acid ester *	14.50	14.00	13.00	12.00	11.00	10.00	12.00	12.00
6. Chlorinated paraffin (63% chlorine)	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
7. Titanium dioxide	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
8. Micronised mica	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
9. Aluminium stearate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10. Aliphatic solvent	45.95	45.95	45.95	45.90	45.90	45.90	45.90	45.90
Water repellency after 2 days:	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
	None	Slight	Good	Very good	Very good	Very good	Very good	Very good

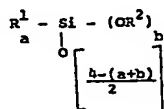
* 30 mole percent methyl ester and 70 mole percent n-butyl ester.

It is found that using the paints according to the invention, a surprisingly good water-repellent action is achieved even when the siloxane resin content is as low as 2 to 5% by weight of the paint. The comparison mixtures, not in accordance with the invention, are distinctly poorer.

Compared to conventional paints for facades, the pigmented paint according to the invention has the advantage of high penetrating power and high adhesion, especially to mineral substrates, including those which have been treated beforehand with silicone resins or other non-polar impregnating agents. The treated facades exhibit high water vapour diffusion, low water absorbency and high water repellency in the sense of increasing the interfacial tension. This assists in regulating the water balance, for example, in walls.

WHAT WE CLAIM IS:—

1. A pigmented paint containing a polymer of a methacrylic acid ester and a siloxane resin having units of the general formula



wherein R^1 is a methyl and/or phenyl radical, R^2 is an alkyl radical with 1 to 4 carbon atoms, a has a value of 0.5 to 1.8 and b has a value of 0.2 to 2.5, the weight of siloxane resin being 10—50% by weight of the polymer.

2. A paint according to claim 1, wherein the resin is one in which b is 0.3 to 1.2.

3. A paint according to claim 1 or 2, wherein the amount of siloxane resin is 2 to 5% by weight, based on the weight of the paint.

4. A paint according to any one of the preceding claims, containing a condensation catalyst for the siloxane resin.

5. A paint according to claim 4, wherein the catalyst is an organo-tin compound.

6. A paint according to claim 4 or 5, wherein the catalyst is dibutyl-tin dilaurate.

7. A paint according to any one of the preceding claims, wherein the polymer of a methacrylic acid ester is a copolymer of a methacrylic acid ester and a copolymerisable monomer.

8. A paint according to Claim 7, containing a copolymer of a methacrylic acid ester and an acrylic acid ester.

9. A paint according to any one of the preceding claims, wherein the polymer or copolymer is a polymer or copolymer of an alkyl ester of methacrylic acid where the alkyl group contains 1—4 carbon atoms.

10. A paint according to any one of the preceding claims, wherein the polymer or copolymer is a polymer or copolymer of an alkyl ester of methacrylic acid where the alkyl group contains at least 3 carbon atoms.

11. A paint according to Claim 9, wherein at least 70 molar percent of the polymer or copolymer is a polymer or copolymer of *n*-butyl or isobutyl methacrylate.

12. A paint according to Claim 1, substantially as hereinbefore described.

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